

of cancer that may result in an exposed population.

Investigation of the extent and impact of groundwater contamination continues, and appropriate criteria for use of DBCP and TCE are expected shortly. An epidemiological survey of some DBCP-contaminated areas is under way so that adverse health effects can be determined.

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Diphtheria and Tetanus Immunization for Older Adults

ABOUT 100 CASES each of tetanus and diphtheria are reported each year in the United States. The majority of tetanus cases occur in middle-aged and elderly adults and follow injuries sustained around the home and garden. Frequently the wound is so minor that medical treatment is not sought before tetanus develops. The case-fatality rate for tetanus approaches 40 percent. While most diphtheria cases occur in children, there are indications of increasing frequency in adults, especially among vagrant men. The diphtheria fatality rate is about 10 percent.

Persons born before the early 1940's, when tetanus and diphtheria toxoids came into widespread use, are likely to be inadequately immunized against these diseases. Serological surveys of elderly adults show that less than 50 percent, and in some instances as few as 30 percent, have adequate immunity to tetanus. For diphtheria the comparable figure may be as low as 20 percent.

The US Public Health Service recommends that all unimmunized persons 7 years old and older have a primary immunization series with adult-type tetanus-diphtheria toxoids (Td) consisting of three doses, the first two given four to eight weeks apart and the third given 6 to 12 months after the second. All adults should, but commonly do not, receive booster doses of Td every ten years for life. The tetanus toxoid component of Td is similar to that in pediatric diphtheria-pertussis-tetanus vaccine; however, only 10 percent to 25 percent as much diphtheria toxoid is present in the adult preparation. Severe local reactions to Td occur in 1 percent to 2 percent of adults

vaccinated, and serious systemic reactions are extremely rare. Many of the severe reactions are the result of overimmunization.

Because elderly adults are often inadequately protected against tetanus and diphtheria, adults should be advised to obtain a Td booster every ten years. Middle-aged and elderly patients should be asked routinely whether they have received a tetanus-diphtheria booster during the preceding ten years. If the answer is uncertain or negative, a booster dose of Td should be given.

Adults who have received wounds should be treated as follows: If the patient has a history of two or fewer tetanus toxoid doses or an uncertain history, a Td booster dose should be given, with follow-up doses given later to bring the lifetime total to three. If the patient has a history of receiving at least three previous doses of tetanus toxoid, appropriate management depends on the nature of the wound. With a clean, minor wound, no Td booster is needed unless more than ten years have elapsed since the last dose; if the wound is more serious or involves a puncture, a Td booster should be given if more than five years have elapsed since the last dose. The use of Td, rather than single-antigen tetanus toxoid, is advised so that this dose can serve as a routine diphtheria booster as well.

Persons with only one previous dose of tetanus toxoid or an uncertain immunization history who have serious wounds (for example, deep puncture wounds, wounds with devitalized tissue, deep wounds contaminated with dirt) should be considered for passive prophylaxis with tetanus immune globulin and possibly penicillin chemoprophylaxis in addition to the necessary Td doses to complete a primary series.

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The Effect of Alcohol on Unborn Babies

IN 1963 Jones and associates described a specific pattern of malformation, called the fetal alcohol syndrome, in the offspring of alcoholic women who continued to drink during pregnancy. The principal features of the disorder include prenatal-onset growth deficiency, developmental delay and

a variety of structural defects including short palpebral fissures, a long philtrum with a thin smooth upper lip, multiple joint anomalies and cardiac defects. It has become clear that the fetal alcohol syndrome as it was initially delineated represents only a part of a more extensive problem. There are, for example, a large number of children born to women who drink either heavily or moderately during pregnancy who have features compatible with the prenatal effects of alcohol but who do not have the full-blown fetal alcohol syndrome. In a recent study from the University of Göteborg in Sweden, it was estimated that for every full-blown case of the syndrome, there is at least one child born with features compatible with the prenatal effects of alcohol who does not have the full-blown syndrome. In that prospective study, Olegard and co-workers determined that 33 percent of the offspring of alcoholic women who continued to drink heavily during pregnancy had the fetal alcohol syndrome and an additional 33 percent had features consistent with the prenatal effect of alcohol; only 33 percent of the offspring were normal. With respect to moderate alcohol consumption, Hanson and colleagues have estimated that 11 percent of the offspring of women who drink between one and two ounces of absolute alcohol a day during the first trimester of their pregnancy have features consistent with the prenatal effects of alcohol. For lesser amounts of alcohol, particularly "binge drinking" during pregnancy, no data are available.

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Gastrointestinal Disease

SEVERAL new viral, bacterial and parasitic agents that cause gastrointestinal disease have been identified in recent years. Studies from different parts of the world have shown that up to 75 percent of acute diarrheal disease is nonbacterial. Rotavirus is the most important viral agent causing sporadic and epidemic outbreaks of diarrheal disease in those 2 years and younger. It occurs typically in winter, causing fever and diarrhea; vomiting is less prominent. Symptoms may persist

for up to eight days. Parvovirus agents, including the Norwalk agent, have been found to cause diarrhea, fever and vomiting that last one to two days in children and adults. Viral gastroenteritis is treated with supportive care.

Campylobacter fetus, formerly classified as *Vibrio fetus*, has been recognized as a common cause of diarrhea in children and adults. In a recent Canadian study, *Campylobacter fetus* subspecies *jejuni* was second only to *Salmonella* as a bacterial cause of diarrhea in children. It was not recovered from stool specimens of children without symptoms. The illness was characterized by fever, abdominal pain, which may be severe, and diarrhea, which may recur. Spread throughout a household is common and pets are possible sources of this disease. No controlled studies of treatment have been reported. Isolates are usually sensitive to erythromycin, aminoglycosides, chloramphenicol and tetracycline but resistance may develop during treatment.

Yersinia enterocolitica causes gastroenteritis in children and adults. Young children often have fever, vomiting and diarrhea and leukocytes may be present in the stool. Older children may present with pseudoappendicitis, fever and abdominal pain; mesenteric lymphadenitis occurs in some cases. Adults with *Y enterocolitica* are also affected with gastroenteritis and, at times, erythema nodosum and arthritis. This infection should be considered in pseudoappendicitis, and serological test and culture are useful in establishing the diagnosis. *Y enterocolitica* has been recovered from a variety of sources including raw milk, water supplies and wild and domestic animals. Transmission can occur from other humans or from pets, and the incubation period is usually four to ten days. The efficacy of antibiotic drugs in treating active disease is unknown as is the effect on the carrier state.

Giardia lamblia, an intestinal flagellate, has been recognized as a cause of diarrhea in travelers in many parts of the world. In the past few years, outbreaks of giardiasis have occurred in the United States resulting from consumption of contaminated water supplies and person-to-person transmission. A water supply not sufficiently chlorinated may contain *Giardia* cysts. Higher chlorine concentrations or additional treatment such as coagulation flocculation, settling or filtration is needed to kill the organisms. Humans and beavers may be natural reservoirs. Persons infected with *G lamblia* may be asymptomatic car-